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LOS ANGELES



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not to do the same things still. Be-
 ware of any suddaine change in any
 great point of diet, and if necessity
 enforce it, fit the rest to it. To be free
 minded and cheerfully disposed at
 hours of meate, and of sleepe, and
 of exercitic, is the best precept of long
 lasting If you fly physick in health al-
 together, it will bee too strange to
 your body when you shall need it. If
 you make it too familiar it will work
 no extraordinary effect when sickness
 cometh. Despire no new accident
 in the body but aske opinion of it. In
 sickle respect health principally,
 and in health action. For those that
 put their bodies to endure in health,
 may in most sicknesses which are not
 very sharpe, be cured onely with diet
 and rest. Physicians are some of
 them so pleasing and comfortable to
 the humours of the patient, as they
 presse not the true cure, of the dis-
 ease: and some other are so regular in
 proce-

Of Regiments of health.

Of Negotiating.

with whom one deales a far off, then
 to fall vpon the point at first, except
 you meane to surprize him by some
 short question. It is better dealing
 with men in appetite then with those
 which are where they would be. If a
 man deale with another vpon condi-
 tions, the start or first performance
 is al, which a man cannot reasonably
 demand, except either the nature of
 the thing be such which must go be-
 fore, or else a man can

Here is a wisdom in
 this beyond the rules of
 Physicke. A mans own
 obseruation what he
 findes good of, and what
 he findes hurt of, is the best Physicke
 to preserve health. But it is a later
 conclusion to say, This agreed not
 well with me, therefore I will not
 continue it, then this, I finde no of-
 fence, of this therefore I may vic it.
 For the length of nature in youth pas-
 seth over many excellencies, which are o-
 wing a man till his age. Dilligence of
 the comming on of years, and thinke



Of Regiments of health.

of Regiments of health.
 Hoppe to petye gcinges. A man
 ought warily to begin charges, which
 once begunne must continue. But in
 matters that returne not, he may bee
 more magnificenc.

Of followers and friends.

not vpon facility. It is a good precept
 generally in seconding another : yet
 to adde somewhat of ones own, as if
 you will graunt his opinion, let it be
 with some destination. If you wil fol-
 low his motion: let it be with condi-
 tion : if you allow his countell, let it
 be with alleading further reason.

Of followers and friends.

He that cannot looke into his own
 estate, had need both chuse wel those
 whom he employeth, yea and change
 them often. For newe are more
 timorous and lesse subtle. In clearing
 of a mans estate he may as well hurt
 himselfe in being too suddaine, as in
 selling is commonly as disadvantage-
 able as interest. He that hath a care to
 repaire in y^e nor dissipate final things:
 and commonly it is lesse dishonorable
 to a bridge penny charges, then to
 B 4

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 able as interest. He that hath a care to
 repaire in y^e nor dissipate final things:
 and commonly it is lesse dishonorable
 to a bridge penny charges, then to*

Of Expence.

Of followers and friends.
 on to him with whom they range
 thei selues, but vpon discontentment
 conceiued against some other, wher-
 vpon commonly insuerth that ill in-
 telligence that wee many times see
 between great personages. The fol-
 lowing by certain States answerable
 to that which a great person him-
 selfe professeth, as of souldiers to him
 that hath been imployed in the wars,
 and the like hath euer beene a thing

The winning of honours is but the
 revealing of a mans vertue and
 worth without disadvantage, for
 some of their actions doe affect Ho-
 nour and reputation, which sorte of
 men are commonly much talked of,
 but inwardly hide aduantage: and some
 darken their vertue in the shew of it,
 so as they be undervalued in opinion.
 If a man performe that which hath
 not bene attempted before, or at-
 tempted

*Of Honour and repu-
 ration.*

proceeding according to art, for the
 disease as they respect not sufficient-
 ly the condition of the patient. Take
 one of a middle temper, or if it may
 not be found in one man, compound
 two of both sortes, and forget not to
 call as well the best acquainted with
 your body, as the best reputed of for
 his faculty.

Of Regiment of health.

Of Negotiating.

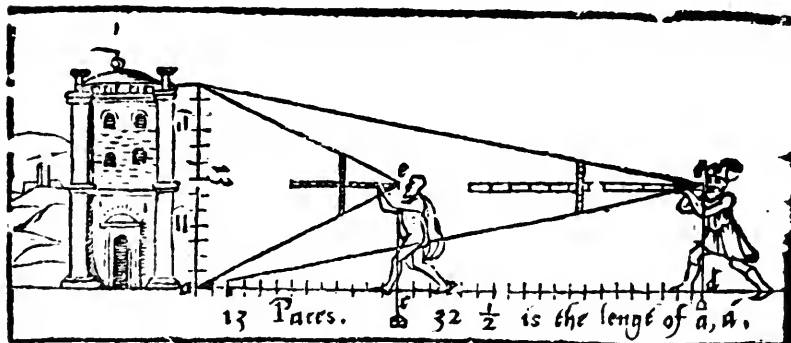


L It is generally better to
 deale by speech then by
 letter, and by the me-
 diation of a third then
 by a mans selfe. Letters
 are good when a man would draw
 an answer by Letter backe againe,
 or when it may serue for a mans ius-
 tification alterwards to produce his
 owne Letter. To deale in person

A BOOKE NAMED TECTONICON,

Brieflie shewing the exact measuring, and speedie reckoning all manner of Land, Squares, Timber, Stone, Steeples, Pillers, Globes, &c. Further, declaring the perfect making and large vse of the Carpenters Ruler, containing a Quadrant Geometricall: comprehending also the rare vse of the Squire. And in the end a little Treatise adioyning, opening the composition and appliencie of an Instrument, called the profitable Staffe. With other things pleasant and necessarie, most conducibile for Surueyers, Landmeaters, loyners, Carpenters, and Masons.

Published by LEONARD DIGGES *Gentleman, in the yeere of our Lord, 1556.*



Imprinted at London by FELIX KYNGSTON,
dwelling in Pater-noster row, ouer against the
signe of the Checker. 1605. .h.t.

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L. D. To the Reader.

Although (gentle Reader) many, excellent in Geometrie, upon infallible grounds haue put forth diuers most certaine and sufficient Rules, touching the measuring of all manner Superficies: yet in that the Art of numbring hath been required, & chiefly those Rules hid, and as it were locked up in strange Tongues, they doe profit (or haue furthered) very little the most part: Certes nothing at all, the Landmeater, Carpenter, Mason, wanting the aforesaid. For their sakes, I am here prouoked not to hide, but to open, and so encrease the Talent which I haue receiued: yea to publish in this our tongue very shortly (if God giue life) a volume containing the flowers of the Sciences Mathematicall, largely applied to our outward practise, profitably pleasant to all manner men in this Realme. In the meane time I shall desire the Artificers aboue named, to be contented with this little Booke (a taste of my good Will towards them) which I wish euen so to further the Readers, as I know it sufficient for the true measuring and readie account of all manner Land, Timber, Stone, Boord, Glasse, Pavement, &c.

Here mine aduice shall be to these Artificers that will profit in this, or any of my booke, now published, or that hereafter shall be, first carefully to reade them through, then with more iudgement. Reade at the third reading, Wittely to practise: So few things shall be unknowne. Note, of diligent reading, ioyned with ingenious practise causeth profitable labour.

This most hartely farewell (loving Reader) to whom I wish my selfe present, so further thy desire and practise in these.

THE PLEASANT PROFIT OR
content of this little Booke, and in what it
exceedeth all other published.

 Ther bookes tofore put forth in our English tongue, contained onely the bare measuring of Land, Timber, and Boord: how agreeable in all places to the rules of Geometrie, let the learned iudge. Here (gentle Reader) thou shalt plainly perceiue through diligent reading, how to measure truly, and very speedily all manner Land, Timber, Stone, Steeples, Pillers, Globes, Boord, Glasse, Pavement, &c. without any trouble: not painted with many rules, or obscure tearmes, nor yet with the multitude of Tables, as heretofore hath been: in which not a few errors were committed: for that cause no iust account might any way be had. Further, ye shall by this booke vnderstand the whole making and comely handling of the Carpenters Ruler, with the true measure, &c. And his vse appointed to the readie measuring of all kinde of Timber, Stone, Boord, &c. Also the leuelling of grounds, and taking of heights, is pleasantly and diuersly practised by the Ruler. Ye haue here not the common, but the rare vse of the Squire, applied to heights, lengths, &c. And to the finding of the iust houre of the day diuers waies, through the aide of pleasant Tables newly adioyned to my generall Prognostication: by the which the proportion of things, direct or squirewise standing, are by their shadowes knowne.

To conclude, in the end of this Booke is added a Treatise, shewing the making, and vse of an Instrument, by which yee shall get lengths, heights, breadths, widenesses, where or howsoeuer they stand. Other necessarie things are contained in this little volume, which I
commit to the diligent
Reader.



DIVERS THINGS CONVCIBLE TO THE ARTE OF Measuring.

The first Chapter.



There are fewe Craftsmen which Character have all the kindes of Arithmetike numerall readily: so I doe suppose none so ignorant, but that they doe, or may easilie perceiue the simple significations of these Characters or figures, 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. And also their strength in the first, second, and third rowes placed.

Besides that, they must bee familiar with these and such like fractions.

$\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{13}$ $\frac{1}{12}$ $\frac{1}{4}$ $\frac{1}{7}$ $\frac{9}{10}$. The first leftward betokeneth one second part of an whole, be it Pearech, Inch, or any other measure: the next, one third, then one seventh part: the other ensuing, one sixteenth. So one thirtie and two parts of an Inch. Then follow three fourths: foure fifths. The last is nine tenths of an Inch: that is nine parts of an Inch, divided into tenne portions.

These I doe intende to put in my examples, and in my tables and margins following, to represent parts of Peareches or Inches. As if I would write halfe an Inch, after this

The Art of

this manner: Three quarters of an inch thus: One eight of a Pearch, on this wise: So of the rest.

It is requisite also here to open what a Pearch, a Day worke, a Koode, and an Acre is.

Although there are divers opinions engendred through long custome in many places, of the length of a Pearch (upon which our chiefe matter dependeth) yet there is but one true Pearch by Statute appoynted to measure by. Wherein is ordained thre Barly coznes drie and round to make an inch: twelve Inches, a Foote: thre Foote, a Parde: five Pardes, and: a Pearch: forty Pearches in length, and foure in breadth an Acre. So an Acre by Statute ought to containe 160. Pearches; the halfe Acre 80. Pearches; a Koode commonly called a quarter 40. Pearches, a day worke 4. Pearches. Lo here the Acre expressed with his length, and breadth.

		Acre.	
Breadth.	1	160	Length.
	2	80	
	4	40	
	5	52	
	8	20	
	10	16	

Instruments
to measure
with Poales
Cord knotted.
Profitable
Raffe.

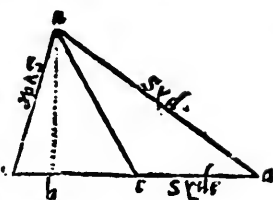
I must not omit here to tell you what thing is meekest to measure land with. They vse commonly in the countrie two Poales, either of them the length of a Pearch. They are very good. Yet for all kinde of Land, a Cozde five Pearches in length, well seared with ware and rosen, knotted or marked at the end of euey Pearch, is moze mete and readier. But in my fantasie, the Instrument Geometricall, which is put forth in the end of this booke, passeth them all and other, for the exact truth and quickest speede. This Instrument is so generall and available to so sondrie things, that it alone requireth a large booke, if it should be sufficiently set forth.

Triangle.

Also I would not haue you ignorant what peece of Land is called a Triangle, which often shall hereafter be named. It is such a fashioned peece as hath (or is imagined to haue) thre sides, and thre Angles onely: whether the sides be equall or otherwise, as this figure sheweth. Againe, note that a line is said to fall Squire wise, when it catteth any thing, or any side of a Triangle full crosse, like vnto a Squire: As the hanging

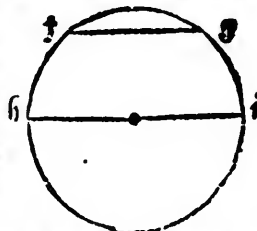
Line falling
Squirewise.

hanging p[er]ked line a. b. in c. d. the base line of the Triangle. Lo it cutteth the side squarewise, or full crosse in the poynt b. and not as the other line a. c. doth. The base of anie Triangle is here called that side, which is cut squarewise of the hanging line.



Base line.

Concerning a Circle, knowe that the compass of anie Circle is named a Circumference: the middle poynt in him his Center: the right line h. i. that goeth ouerthwart that Center touching the Circumference on both sides is his Diameter: the halfe of that line, the Semidiameter. Also an Arch is a peece of the Circumference cut away, as ye see the Arch above the line f. g. Also f. g. h. i. in this Circle are named Parallels: for that they differ equally in all places, the one from the other.



Circumference.
Center.
Diameter.
Semidiameter.
Arch
Parallels.

Note, because practise and experience sheweth me, that there is almost no Land, but it may easily bee brought by imagination to a Triangle or Triangles, and so most truly measured: therefore, to be short, this order shall be taken. I will first figure and set afoze your eyes Triangled Land, and other which by imagination shall be brought into Triangles. When I shall teach the true measuring of them: I meane, how to finde a length and breadth, w[ith] which ye shall enter the table of account following, where the Acres and odde Peaches (if there be any) shall appeare. As these figures are measured, so all Triangled Land, and other brought into Triangles, of what fashion so ener they be, shall be measured. And because it is requisite for true measuring of all Triangles, to finde a straight hanging line, I shall shew first how that line is to bee found, imagined, or drawne.

How

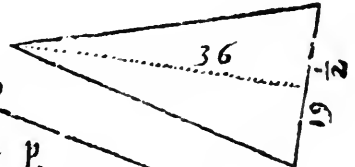
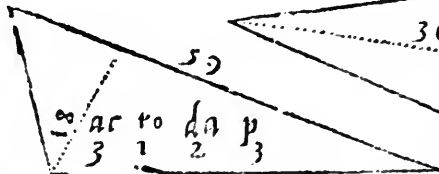
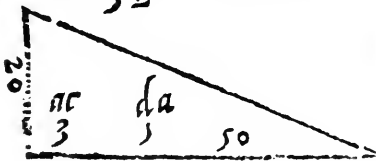
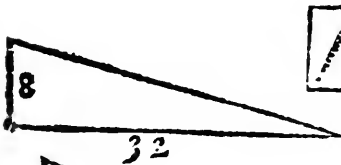
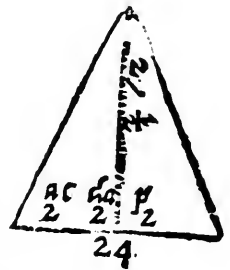
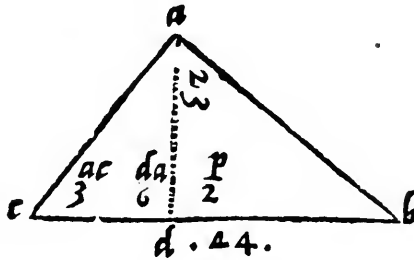
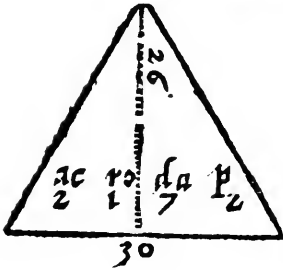
The Art of

How the right hanging line in Triangles is drawne.

The ij. Chapter.

To draw a hanging or plumbe line.

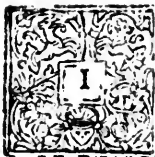
This straight hanging line in all Triangles is ever drawne or imagined from any Angle, cutting some one side of that Triangle squairwise: as y^e may perceiue the picked lines in the Triangles following. By the helpe of this line, all Lands of Triangle fashion, are brought to be measured as ensueth.



How

How to measure all manner Triangled Land.

The ij. Chapter.



If thou bee an Arithmetician, multiplie this Euclid the 1. Bookc. 41. pro.
 height hanging line, drawne, as aboue is
 shewed, in halfe the number of Pearches of
 that side, which it cutteth squirewise. For
 want of the knowledge, take the also named
 Pearches (I meane of the hanging line, and
 halfe the side which he cutteth) and with that length and
 breadth enter your table of account, as there is set forth. So
 shall ye perceiue the number of Acres, Rods, Dayworks, &c.

Example.

For the perfect measuring of Triangles afoze figured, and
 all other, suppose the second of these last nine figures of the
 other side, having written aboue it a. b. c. d. to bee a peece of
 land, whereof I would haue the true measure, I finde by a
 Cozde, other wise, the pyked hanging line a. b. to bee 23.
 Pearches: the side b. c. which it cutteth squirewise 44. Pearches,
 whose halfe is 22. With these 22. and 23. the conuenient
 length and breadth, I enter the table of account. There
 I finde by that Table at the corner where both the lines of
 conuenient length and breadth doe meeete 3. Acres, 6. day
 workes, and two pearches to be in that Triangle. Thus of
 all befoze figured.

Here note your Table must euer bee entred with all the This Table followeth.
 Pearches of the hanging line, and with halfe the side that he
 cutteth squirewise. **D** With the halfe hanging line, and the
 whole side cut.

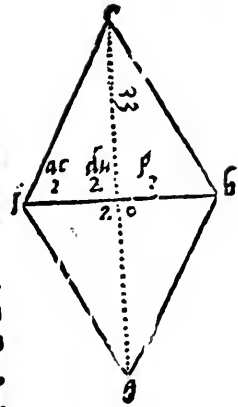
B

A figure

The Art of

A figure of a double Triangle.

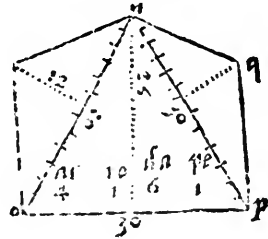
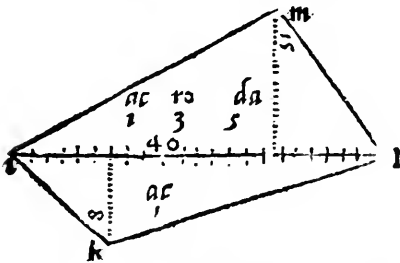
This figure e.f.g.h. is but two Triangles: and therefore measured as above in two parts. Thus: The hanging line, e.g. is 33. Perches: the side f.h. that bee cutt squarewise 20. Perches, the halfe of the which is 10. Now enter your Table as afoze, with 33. and 10. the convenient length and breadth. So shall ye finde two Acres, two Daywozkes, and two Perches, the true content of this figure e.f.g.h.



Another example.

Figures of many Angles.

Admit i.k.l.m. land to be measured. Because it is no many Angles, it must be brought by imagination, as I have said, into a Triangle or Triangles. Which imagination is here signified by the line dashed i.l. Then as above is



declared, it ought to bee measured (according to the rule of Triangles) in two parts, because there are two Triangles in that land. So by prooffe ye shall finde in the upper i. m. l. one Acre, 2 Roodes, and five Daywozkes: in the other i.k.l. one Acre. Thus I gather the whole content of that Land, to bee two Acres, three Roodes, and five Daywozkes.

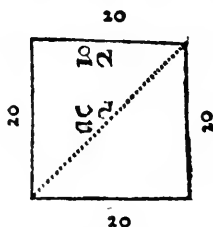
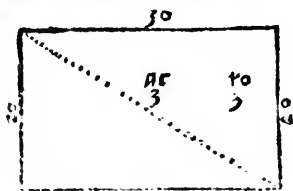
Done

measuring of Land.

None other wise of the adoynd n.o.p.q. and all other figures following: and other whatsoever they are, that by any meanes may be brought into Triangles.

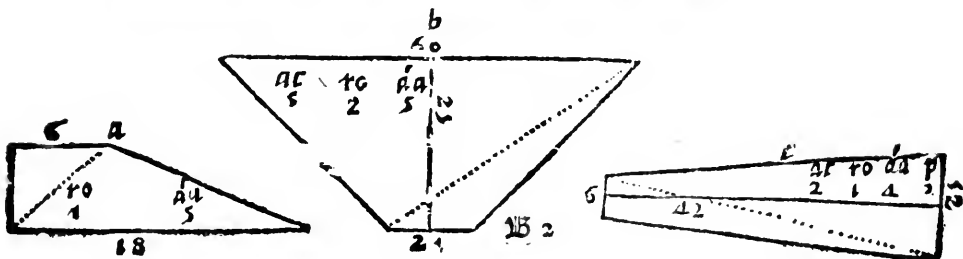
Furthermore know that the figure i.k.l.m. is readily thus measured. Adde the Pearches of both the hanging Lines together: so have yee 23. With this number, and with halfe the Pearches of the side, i.l. which bee cutteth square wise, being 10. Pearches, enter your Table. So is found as afoze.

These two figures following may also bee thus measured, other wise then by the rule of Triangles. Enter your Table with their convenient length and breadth. So shall you finde the contents of all such.



These three figures following, although they may be measured by the rule of Triangles, yet so; quicker speede, they have also their proper measuring as ensueth.

Lay together the two sides which are parallels of the first figure a. that is 6. & 18. making 24. the halfe is 12. the breadth 5. Enter with 5. and 12. your table. So have you one rod, and five day works. For the other two b.c. and such like, loyne the heads or ends in one: and enter your table with halfe of those Pearches, and with the whole number of the middle line.



The Art of

How by supputation to measure all triangled land.

To measure
triangled land
by supputa-
tion.

I Opne all the sides together : take halfe out of that halfe, pull every side, noting the difference. Then multiplie the differences, the one in the other, and the third difference augment in the product. That which encreaseth, multiplie in the halfe of all the sides toynd. Then the Radix of the surmounting summe is the content of that Triangle.

Four rules
following.

Now rest foure Rules to be treated of. The first for all manner Regular square Superficiis. The second for round Land, and her parts. The third for Steeples, Columns, Globes, and their parts. The last for Mountaines, and Valleys. Here they shall in order follow.

A rule for all maner Regular or right squared Land of many sides, as 5.6.7.8.9.10.20 100.&c.

The iij. Chapter.

To measure
land of many
sides.



M easure and lay all the sides together, taking the halfe number of Peaches there contayned. Then draw a right hanging line from the Center or middelt of that figure, or the indest of some one side. And with that length and the other, enter your Table. Note that the Triangle of all sides like, and the Quadrate figure are also measured by this rule.

Example.

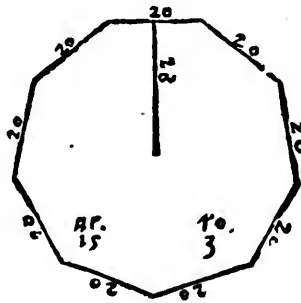
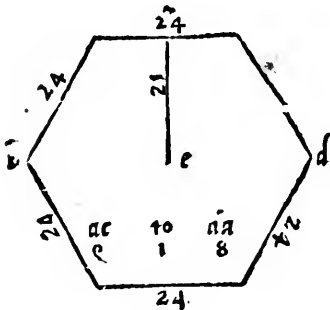
S uppose this figure a. b. c. d. to be a five square piece of Land, and every side 24. Peaches. The halfe summe of all

measuring of Land.

5

all sides is 72. Peaches: the right hanging pycked line a. c.
 21. Peaches. With these two numbers ye must enter your
 Table of account following hereafter. And doe as is open'd
 in the declaration there adoynd, when pumbers surmount
 the Table as they doe here.

So shall ye finde 9 Acres, 1. Rod, and 8. Daywozkes, the
 content of this figure a. b. c. d. Euen thus is the other nine
 squared figures measured, and such like.



A Rule for round Land, and the parts thereof.

The v. Chapter.



Alfe the Diameter multiplied in halfe the Cir. Archimedes
 cumference, sheweth the content of any Circle. in libello cir-
 culi mensura-
 tionis.

Do thus more plainly. Ye shall enter your
 Table with halfe the number of peaches of the
 whole Circumference or compasse, and with
 the number of halfe the Diameter or bycath. So haue ye
 the content.

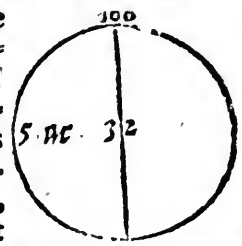
B 3

Example.

The Art of

Example.

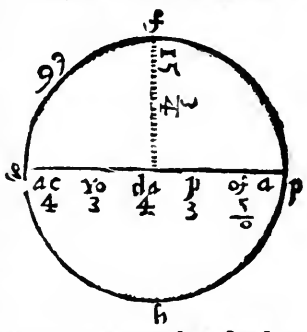
Suppose a peece of Land, where of the compasse is 100. pearches, the breadth 32. Pearches, I would know how much Land is in this figure. Enter your Table with halfe the compasse, that is 50. and with halfe the breadth, that is 16. Pearches. Because in the Table I cannot finde 50. for the greatest length is 40. (therefore I enter with 40.) and 16. So I found foure Acres. When I enter againe with 16. Pearches remainyng, and 16. the breadth as befoze, that bringeth 1. Acre. Now to conclude by addition of 1. and 4. I finde five Acres in that round Land, whose halfe compasse is 50. Pearches, and the breadth 16. Pearches.



How parts of Pearches are to be counted in measuring.

For perfect knowledge and vse of this Table following, when parts of Pearches are adsoyned, note well this other example that ensueth, and also what is said of the declaration annexed unto the table, when parts of Pearches are in the length, breadth, or both.

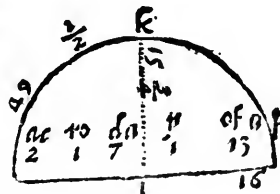
Imagine f.g.h. to be a round peece of Land: I finde by measure the whole compasse, 99. Pearches. The halfe is 49. $\frac{1}{2}$. The hanging Line or halfe breadth is 15. $\frac{1}{2}$. Enter your Table with the whole Pearches, that is 49. and 15. leaving out $\frac{1}{2}$. and $\frac{1}{2}$. which were but parts of pearches. So haue



pe 4. Acres, 2. Woods, 3. Dayworks, and 3. Pearches. For those parts of Pearches omitted, at your first entering the Table, worke thus. The halfe Pearch, Quarter, or other part of a Pearch in the length, must bee reckoned by themselves in the whole breadth, and those of the breadth contrarie wise in the length. If there bee such odde parts in both, then reckon them of the length in the whole breadth, and them of the breadth in the whole length, topning to the other afoze gotten, remembryng the product of the one fraction multiplied in the other, to be pulled from the entcrease. To make this matter plaine, I will take this last example befoze. The one number wherwith I should haue entred my table, was $49\frac{1}{4}$. the other $15\frac{1}{4}$. I found first by entering with 49. and 15. (omitting the odde parts) 4. Acres, 2. Woods, 3. Dayworks, and 3. Pearches. Now for the encrease of the Parts of Pearches left out, I must (as I said) reckon them of the length in the breadth, and contrarie wise them of the breadth in the length. Halfe $15\frac{1}{4}$. is 7. Pearches, and $\frac{7}{8}$. Thre quarters of 49. is 37. Pearches, $\frac{7}{8}$. Which added, makes 45. Pearches. This adtopned to the number afoze gotten, byingeth the whole content of the round figure, which is 4. Acres, 3. Woods, 4. Dayworks, 3. Pearches, and $\frac{7}{8}$. of a Pearch, the product of the one fraction multiplied in the other subducted. What must be done when the numbers wherewith ye should enter, exceede your table, counsel the declaration of your table there adtopned.

Of the halfe Circle.

For this halfe circle, enter the Table with halfe the compass, and with halfe the Diameter of the Circle, or with the length of the pitched hanging line, k.l. So the content of this halfe Circle is 2. Acres, 1. Wood, 7. Dayworks, 1. Pearch, and $\frac{1}{4}$. of a Pearch.



To measure halfe circled Land.

Another

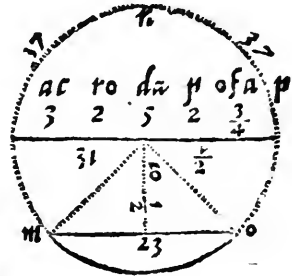
The Art of

Another example of Portions and parts of a Circle.

Suppose n. m. o. following, were a part of a Circle of p^{ar}ce So^{me} Land, whose Content ye desired. The whole Compasse of the Circle which this portion representeth, is (as aforesaid) 99. Pearches : his Diameter or breadth 31. $\frac{1}{2}$. The prick'd Arke or Compasse, n. m. o. is 74. Now with the halfe Breadth or Semidiameter of the Circle, 15. $\frac{1}{4}$. and with 37. the halfe of the prick'd Compasse : enter your Table. So haue ye 3. Acres, 2. Roodes, 5. Daywozkes, 2. Pearches, and $\frac{1}{4}$. of a Pearch, the Content of the p^{ar}ce of Land full of prick's, to the sides of the Triangle prick'd.

To measure
parts of cir-
cled Land.

If ye desire to know the sum of Pearches in the other portion beneath the Triangle, separated by the Line m. o. p^{ar} must adde the Content of the Triangle (which is 3. Roodes and $\frac{1}{4}$. of a Pearch, found by the Rule of Triangles) to the Acres and Pearches before searched. So haue ye 4. Acres, one Rood, 5. Daywozkes, three Pearches, and $\frac{1}{4}$. of a Pearch.



This subtracted or pulled from the number contained in the whole Circle, the remaine is the Pearches included in the small peece beneath the Triangle. That is, 1. Rood, 36. Pearches, and $\frac{1}{4}$. of a Pearch.

How mixed Figures are measured.

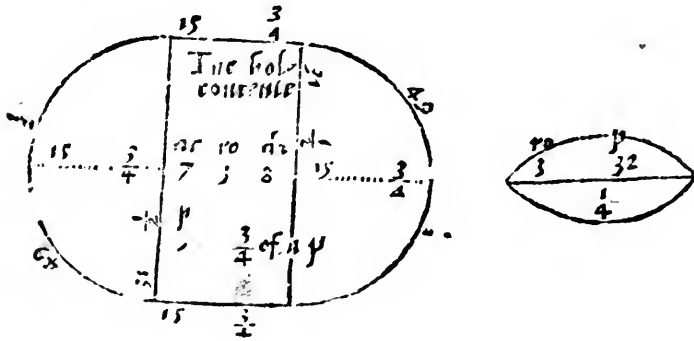
Land com-
pounded of
circles, or his
parts.

I thinke none now will doubt how these two figures following are measured, because they are made of portions or parts of Circles, whose measure is before sufficiently opened

measuring of Land.

7

ned, the one consisting of two halfe Circles, & a Quadzangle: the other being the portions of the Circle, in o. doubled.



If any eull fashioned Land chance to be measured, which requireth to bee brought into many Triangles, to save labour, ye may adde some portion unto that, and make it square, or otherwise. So let it then be measured: and after, from the product pull away that ye added: the remaine is the Content.

To finde the content superficiall of Steeples, Columns, Globes, and their parts.

To the Arithmetician I say: for picked Steeples, multi- To measure Steeples, Columns, Globes, &c.
 plie the whole side in halfe the Circumference of the Base, adding the plaine of that Base. For pillars, augment the Circumference of the Base in the Heights, putting to the Circumference of both Bases. For Globes, the Diameter in the Circumference multiplied: even so of fragments or parts. Let them that bee void of Arithmetike enter my Table of account following, with such numbers as I now willed the Arithmetician to multiplie, not forgetting what I have before written. So I serve their turne.

¶

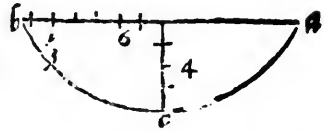
Or

The Art of measuring

Or thus by the rule of proportion, the parts of a Globe are found.

To measure parts of Globes.

Suppose a. b. c. to be a pece of a Globe, and 4. to be a proportion of the Diameter, the whole being 14. Thus I say, 14. the whole Diameter giueth 616. the Content superficiall of the Circle : what shall 4. being : So haue ye 176. which is the content of that pece.



To find the Diameter by some knowne portion thereof.

To finde the vnknowne Diameter of a Globe.

If ye be ignorant what length the Diameter of the Globe is, whose proportion ye haue, the height or part of the Diameter being 4. foote, augment halfe the line a. b. which is 6. $\frac{1}{2}$ in himselfe, and the product diuise by 4. So haue ye 10. to be added to 4. which maketh 14. the whole Diameter.

The true measuring of Mountaines and Valleys.

The vi. Chapter.

To measure Mountaines.

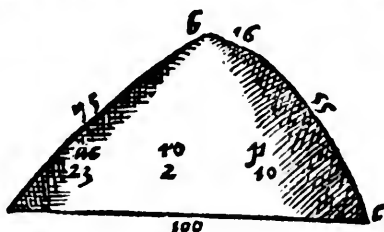


First ye shall measure the circuit of the Foote, or Base of the Mountaine: then the compasse of the Summitte or top, adding them together. So shall ye doe of the Ascenscs, that is, the going vp from the foote to the top, topning the measure of the longer and shorter in one. Now take the halfe of the circuit added, and the halfe part of the Ascenscs topned, and enter your Table : there shall ye see the Content.

Ensample.

Ensample.

A. b. c. is the Mountaine: a. c. the circuit of the Base, being Figure of a 100. Pearches, b. the top 16. Pearches. Which toynd toge, Mountaine. ther make 116. b. c. the one Ascense is 55. Pearches: the othet 75. These added make 130. The halfe of the circuits is 58. the halfe of the Ascenses 65. With these two summes ye shall enter your Table of account, tohere ye shall finde 23. Acres, 2. Rodes, and 10. Pearches, the true content of this figured hill.



Of the Valley.

AS in the Mountaine ye measured the circuit of compass To measure of the Base of foote: so here contrarie ye shall meete Valleys. round about the circuit of compass of the height of the Valley. And as ye got the measure of compass of the top of the Mountaine: so measure the circuit of the depth of the Valley. In like manner as ye measured the Ascense, that is, the going up from the foote to the top: so measure the Descense or going downe of the Hill, to the depth of the Valley. The rest al work, as I haue shewed you in measuring the Mountaine.

For more plainnes, behold this ensample of figure. If ye lay together the circuits of the height & depth, which is 210.

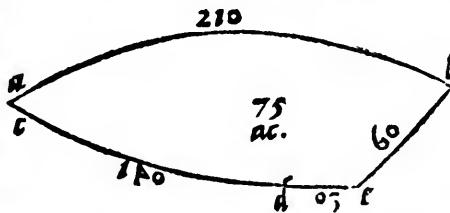


Figure of a Valley.

and 30, taking the halfe part of those two Circuits, making
C 2 an

The Art of measuring

an 120: then the two Ascences 140. and 60. added in one product 200. the halfe thereof being 100: with this and 120. the other halfe of the Circuite, *per* may enter your Table. What doing, loe 75. Acres.

How the Table of account now following, is to be vsed.

What is to be done when numbers, with which you should enter, exceede your Table.

When you have gotten a convenient Length and Breadth, (as I haue aboue declared by diuers Triangles and other figures) then you shall enter this Table. Seeke there the Length, and most number of Pearches in the higher margine, which beginneth at 1. and endeth rightward at 40. Loke the other summe of Pearches (I meane the Breadth) in the right side and hanging margine, from 1. descending to 30. Now at the meeting of the lines, where the one answereth the other directly in a square, you shall finde the Acres, Roodes, Day workes, and Pearches. Note that the first number set on the left side, and vpper part in any square, signifieth the number of Acres. The figure 1. set in the vpper part, and right side, doth betoken a Rood: the figure 2. there two Roodes, 3. thzee Roodes. And the figure in the left side beneath, signifieth a Day worke, or day workes. A figure in the lower part rightward, declareth Pearches.

A Declaration adioyned.

When it chanceth that the one number or both, with the which *per* should enter this Table, are greater than any here found: it behooreth you to take the halfe of the one, and the whole of the other, or what parts ye list of both, most commodious for your purpose, & so enter your Table. Looke then what is there found, and it shall beare his name of the parts multiplied in themselves.

Ensample.

Ensample.

Suppose the number with the which ye should enter your Table to bee 103. Pearches in length, and the breadth 60. neither of these may be found in the margines: wherefoze I take the third part of an 130. which is 34. Pearches, and one remaineth.

The halfe 60. that is 30. I finde with entering them at the common meeting 6. Acres, 1. Rood, and 5. Day workes.

This summe must haue his name of the parts augmented in themselves. I tooke the third part of the one, and halfe the other number, therefore 2. must be multiplied in 3.03 contrary: so haue ye sixe, which signifieth that ye haue found by entering, but the first part of the number ye should finde.

Looke what I haue shewed in the chapter of parts, that vnderstand here of whole Pearches. least subtracting, &c.

Wherefoze I must take this summe tofoze found (being Acres, 1. Rood, and 5. Day workes) sixe times as much. So haue ye 33. Acres, and one Rood. If the Pearch remaining in the length, reckon him in the breadth (as is afoze declared) in the first Chapter of the Remaines: so haue ye 60. Pearches moze to bee added. So the increase of these two numbers, 103. and 60. amount to 38. Acres, two Rodes, and 5. Day workes. Thus any manner length and breadth is reduced to this Table following, which sufficeth.

This with few words is ended the certaine measuring of all manner Land, touching the Superficiall Contents. Wherefoze now shall follow the true measuring of Timber, Stone, Steeples, Pillars, Globes, according to their Crassitude.

Such as are altogether ignorant of Arithmetike, may reckon by our English rogne, allowing for every Pearch in length or breadth a pence, and so euery Marke makes an Acre, euery Noble halfe an Acre, euery fortie pence or halfe Noble, a Rood, and euery pennie a square Pearch. And so by memoie without Tables, may in some rude and grosse manner, cast by reasonable iust the true contents of all Closets, Bedowles, Parthes, Wils, Valleys.

	1	2
1	1	2
2	2	3

The
 of a

TABVLA COMPUTATIONIS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

The table
of accomps.

Place this Table after the white page in C.



TO THE READER.

T commeth commonly to passe, that Carpenters, Masons, and such like Artificers, are put either to measure timber euerie way square, or squared logges, broader on the one side than on the other: yea, many times mutilate or vnperfect stuffe. Sometimes three, siue, ten, or twentie square in the head, and so through: oftentimes round Stone or Timber with hollowed, &c. Afore I shew vnto them what must be done with such peeces of Timber or Stone, to get their true measure, my desire shall be, that such Craftmen will leaue to be heady or self willed: yea so greedily to sicke to their corrupted rules, that vtterly they refuse to be taught.

Both learning and experience declareth vnto me, that the grounds which the best of them haue, are false. To open how and where, it needeth not: neither doth it appertaine to instruction, onely it may suffice him that liketh the true way, here to receiue it appointed to him. Yet to satisfie and content him which will not belecue any such errors or false grounds to be, I say (and truly) that the Ruler of Timber measure, which the most part of them hath, is not made by right Art. Besides.

To the Reader.

sides that, their craft in seeking the Square of some Timber is very false. They vse in measuring, to lay the broader and narrower sides together in a summe, and to take the halfe of that number for the Square. Then they seeke this vntrue Square vpon the false Ruler, and so measuring the Timber, they conclude of it vntruly.

As this is corrupted, so are other Grounds which they take to be infallible. Now to the purpose: touching the correction of those Errors, with other not mentioned, whereby true measuring may ensue, this way shall be taken. After I haue opened how you must handle all such fashioned Timber (as afore is spoken of) there shall follow a Table, in which ye may finde (as I will declare) the Square of any Stone or Timber.

In a Foote
square is con-
tained 172.
Inches.

That knowne, it is requisite to haue another Table immediatly following, which may appoynt to all true Squares from 1. to 6. inches; the iust length to make a Foote euery way square. With the length agreeable to your Square, your Logge must be measured. And as oft as ye find it from the one ende to the other of your Timber, so oft ye may conclude the Foote square to be contained in that timber Logge, or Stone: that is, so many square Feete there to be included. This Table of Timber measure standeth in the place of a good Ruler,

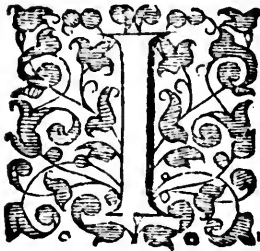
well decked with true measures. By this ye may make or correct Rulers at pleasure, as after appeareth.

*Now orderly followeth the true measuring of all fashioned
Timber or Stone asorenamed.*



How Timber or Stone fouresquare
 euery way, or broader on the one side
 than on the other, is meafured.

The vij. Chapter.



If a peece of Timber or Stone, be
 either equally square, broader on the
 one side, than on the other, yee shall
 take the last measure. I meane, how
 many Inches the broader side con-
 taineth : euen so of the narrower.
 This done, yee must seeke in the Ta-
 ble of Squares following, the mea-
 sure of the broader side of the Tim-
 ber or Stone, in the upper margine of that Table.

Then looke so; the number of Inches, of the equall or narrower
 side in the right part and hanging margine. At the common
 meeting where the one number answereth directly to the o-
 ther, there your true Square shall appeare. This Square so
 found, shall be referred to your Table of Timber measure :
 in the which yee may plainely see (if you runne downe by the
 left margine, untill your Inches square appeare) how many
 Feete or Inches of your Ruler belongeth to a Foote square.
 As often as that measure there found is contained in the
 Timber or Stone, so often and as many Feete square yee
 may conclude (without doubt) the peece of Timber or Stone
 to haue.

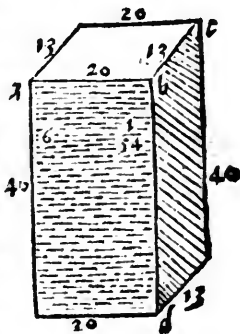
D

Ensample.

The Art of measuring

Ensample.

Suppose this squared Timber or Stone a. b. c. d. were to be measured, the broader side a. b. 20. Inches, the narrower side b. c. 13. Inches, the length 40. Inches. Now I must seeke the broader side 20, in the upper margine of the Table. The narrower side 13, must be found in the right side and hanging margine. At their common meeting, 16. Inches, and $\frac{1}{4}$. part of an Inch shal appeare. This true square must be searched for in the Table of Timber measure. Therefore looke for 16. in the margine of this Table. In the Squares with him rightward, ye shall finde 6. Inches, and $\frac{3}{4}$. which is thre quarters of an Inch. Some deale lesse of your Ruler than 6. and $\frac{3}{4}$. laid out vpon the Timber, maketh a Foote Square. And that measure so directly handled, is contained in the length of your Timber six times. Therefore affirme six Foote there to be, beside that is left $\frac{1}{4}$. part of a Foote. Note because the Squares at all times (in this Ensample) rise not to even Inches, but sometime to odde parts: therefore according to your discretion, adde or take away some part more or lesse in setting forth the Foote square, as aboue is perjoymed.



It were intollerable tediousnesse, yea impossible to let forth the true quantities of Timber measure, to all odde quantities of Squares. The discrete handling of these, the wittie shall bring to a sufficient exactnesse.

Of

Of Timber or Stone, 3. 5. 10. 20. or more sides Square, &c.

The viij. Chapter.

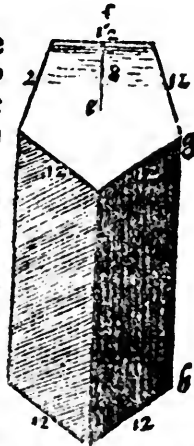


When Timber hath diuers equall Squares in the head, and so throught: first measure all the square sides round about the head or end of the Timber. Then take halfe the number of the whole measure for one breadth.

Then measure from the Centre (which is the middle of the head, or end of the Timber) to the middle of the square side, betweene the two Angles, and take the measure of that distance for the other breadth. Now resort with the measures of these two breadths, (as tofore) to the Table of Squares: seeking the bigger number or breadth in the upper margine, and the other lesser in the side margine. With the Square there found, haue recourse to the Table of Timber measure, and doe as I haue instructed.

Ensample.

Admit this small peece of Timber five square, e. f. g. h. should be measured, every side being 12. Inches. If ye adde together in one summe all the five sides, they make 60. Inches. The halfe is 30: that serueth for one breadth. When the Line e. f. which goeth from the Centre or middle of the Square to the middle of one side, is 8. Inches. The two numbers 30. and 8. must be sought (as before) in the table of Squares following. At the common meeting, your square shall appeare 15. Inches, & 7. This square 15. seeke in the Table of Timber measure. There ye may see right with it 7. Inches, and 7. Now because of 7, the odd quantitie of the



The Art of measuring

Square about 15. Inches, lay something lesse. Then see how oftentimes that measure (so with discretion handled) is from the one end of your Timber to the other: and affirme so many times a foote square there to be, as that measure is found in the length of your Logge.

How round and hollow Timber, Steeples, Pillers, Globes, &c. are to be measured.

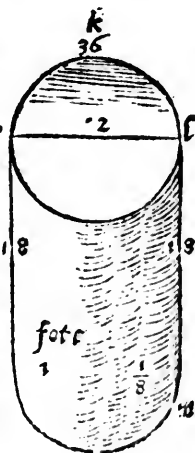
The ix. Chapter.



First gird the Logge round about with some line: then diuide the line which compasseth that timber in two equall parts: keepe the one part for the bigger breadth. After, ye shall diuide againe that whole length (the two and twentieth part cast away) in threeparts, and take the halfe of one of them for the other narrower breadth. With the measures of these two breadths, haue to your table, performing all things as afoze is opened.

Example.

Suppose this little peece of Timber, i. k. l. m. were to be measured, the compasser or girding 36. Inches, the halfe of that is 18. being the one breadth: then the thirde part of 36. is 12: the halfe of it is 6. which is the other narrower breadth, with these two numbers 6. and 18. enter the Table of Squares following, and so the Table of Timber measure. At the last (all things performed as before) ye shall finde in this round Log, the length l. m. being eightene Inches, one Foote, and $\frac{1}{3}$ part of a foote. This is sufficient for all such like.



A note of hollowed Timber.

If it chance that hollowed timber be to be measured: measure the whole Logge as though it were not hollow, as a bone is declared. Then measure the narrower and broader side of the hollow, and see what is contained in that, as though it were massie Timber. Now pull out the Content of it, from the whole abone measured: the remaine of soze must shew what timber is included in that hollowed body.

IAm unable in few words to expresse to the unlearned, by what meane Pyramidall, or picked regular Steeples of all fashions are measured. Also how Pillers, how the Content of Globes or Bowles are searched, unless the Art of numbering were taught. What being knowne: thus (as now followeth) I teach.

How the crassitude of picked Steeples is knowne.

Multiply the plaine of the Base in the third part of the Height: so ye have the Crassitude. Or multiply the Content superficiall (found as I have instructed) in the height of the Steeple, taking for your purpose the third part of that product.

How the Content of Pillers is knowne.

Ecrease the Base plaine in his Altitude or Height: so have ye your desire.

The Art of measuring

How the Cubicall bodies of Globes are searched.

The Content Superficiall found, (as I haue opened) must be multiplied in the first part of the Diameter: the product is that ye require. Or the third part of the Superficiall Content in halfe the Diameter. Or multiplie the plaine of the Circle in the whole Diameter: then take two third parts, which added, make the Crassitude.

Of the halfe Circle.

His Superficial Content multiplied (as I said) by ingeth the magnitude of him. If any man require ensamples of these last matters, or more sufficient handling: let them resort vnto my bookes published of Geometrie, where they shall be satisfied. These little appertaine to Carpenters or Masons: therefore not by ensample declared.

A generall note.

When thou shalt be put to measure some Body, without order or fashion, lacking part of his Square, or hauing more than his Foyme: if it lacke, thou shalt make it perfect by obseruing diligently the running together of the sides. The parts wanting shall be measured, as though they were there, which portions must be taken from the whole Bodie measured.

Also when there resulteth any more than the forme or regular Square: first measure the square Bodie: then the Crassitude which aboundeth. All ynt together, doe they to the whole Irregular Bodie. This sufficeth.

A Table to finde the iust Radix or Square of any Timber or Stone.



L beholdeth you to know that this Table following is made for the true square of any manner Timber. Therefore understand that the numbers from 1. to 40. set about in the high margine, betoken the inches of the broader side of the Timber. And the numbers from 1. and so downward to 30. put in the right part & hanging margine of this table, signifie the inches of the narrower side: and to conclude briefly, the Element of figure set in every square roome, betoken the iust square. The bigger figures leftward in euery square place, signifie the whole inches. And the other lesser rightward in the same square diuided by a line the parts of inches, as $\frac{1}{2}$. &c.

This first Fraction toward the left hand betokeneth one halfe part of an inch: the other two fifts of an inch, and euery figure of fraction hauing a point adioyned vnto him, some deale lesse than that part is: as this part, $\frac{1}{5}$ representeth scant halfe an inch, a very little quantitie lesse. And if it had two pyckes by him, he should haue declared some quantitie moze: as this other fraction of part, $\frac{2}{5}$: which is moze than two fifts, a small deale.

It had not been needfull to haue put the parts of the Square so precisely as they are here: neither is it requisite so curiously to take them.



	1	2	3	4
1	1	$\frac{3}{2}$	$\frac{3}{4}$	2
2	2	$2\frac{2}{5}$	$2\frac{4}{5}$	$\frac{4}{5}$
3		3	$3\frac{1}{2}$	
4			4	

The Table
of Squar

The Table of Timber measure, with the declaration and vse of it.

The x. Chapter.

This Table (as yee see) is divided into two Columns or Rows: the one very short, the other longer. In the head of the first, I have put this word foot: in the second row, Inches, and parts: to signifie Feete, Inches, and parts of Inches. The sumaris in the margine and left part of the first and second columnne, declare the quantitie of the square of Timber or Stone, from 1. to 36, Inches square. Within the rows you may finde the full length to a foote square, if yee enter into them in right order according to the square.

Example.

Suppose the square of your Timber were 7. Inches, and that yee desired to know what measure or length of the ruler would make a foote square: seeke in the left margine, seven Inches: and with him in that order toward the right hand, ye shall find 2. foote, 11. Inches, and $\frac{1}{4}$. of an Inch. Note because the fraction $\frac{1}{4}$ hath a prick by him, it betokeneth some small quantitie lesse then $\frac{1}{4}$. of an Inch. If it had 2. prickes or points thus $\frac{1}{16}$; it shuld signifie some little quantitie moze. Neither maketh it matter whether ye obserue this pricking or no, the quantitie is so little to be added or pulled away.

Note what hath been spoken of Timber, the same also is to be understood of Stone, likewise to be measured.

Thus is finished the measuring of Timber.

Now ensueh of Boord.

foote		Inches		Parts	
1	144				
2	36				
3	16				
4	9				
5	5	9		$\frac{1}{4}$	
6	4				
7	2	11		$\frac{2}{7}$	
8	2	3			
9	0	21		$\frac{1}{7}$	
10	17	$\frac{2}{7}$			
11	14	$\frac{2}{7}$			
12	12				
13	10	$\frac{11}{7}$			
14	8	$\frac{11}{16}$			
15	7	$\frac{2}{7}$			
16	6	$\frac{3}{4}$			
17	6				
18	5	$\frac{1}{4}$			
19	4	$\frac{23}{28}$			
20	4	$\frac{17}{16}$			
21	3	$\frac{11}{12}$			
22	3	$\frac{4}{7}$			
23	3	$\frac{1}{4}$			
24	3				
25	2	$\frac{3}{4}$			
26	2	$\frac{11}{16}$			
27	2	$\frac{3}{8}$			
28	2	$\frac{1}{4}$			
29	2	$\frac{1}{16}$			
30	1	$\frac{11}{10}$			
31	1	$\frac{4}{7}$			
32	1	$\frac{11}{10}$			
33	1	$\frac{1}{3}$			
34	1	$\frac{2}{7}$			
35	1	$\frac{1}{7}$			
36	1	$\frac{1}{4}$			

Tables, Boord, or G'asse.

How Tables, Boords, Glasse, or any
such like, are measured, according to their
length and breadth, onely to the toote
square.

The xi. Chapter.



This thing is performed by the helpe of a large Table following, divided in five small Tables, and as many Margines. The first and left Margine beginneth at $\frac{1}{2}$. which is one quarter of an Inch, and extendeth to five Inches, as y^e may plainly perceiue if ye runne downe by that Margine. This hath his Table on the right side adioyning vnto him. The other taketh his beginning at five Inches, $\frac{1}{2}$. and endeth at twelve, hauing his proper Table also. The third from 12. $\frac{1}{2}$. to 18. And so from 18. $\frac{1}{2}$. to 24. from 24. $\frac{1}{2}$. to 30. The last Margine is from 30. $\frac{1}{2}$. to 36. and there endeth.

Of this that is said, you may gather that every Margine hath his Table on his right side. Also you must know that in the top, and beneath, I haue put (as in the Table of Timber measure) these words, Foote, Inch and Parts, to signifie Feete, Inches, and parts of an Inch. Whensoever ye list to measure Wood, Glasse, or any other such, with the breadth of it, enter this Table, and seeke that breadth in his proper margine: there y^e shall finde in right order how many Feete, Inches, or parts of an Inch, belong to a foote square. So often as the measure is in your Cusse, iust as many foete haue y^e in that Wood, or such like. If the breadth excede this Table, then diuide the breadth in parts, and worke as is said: It will be declared. So the ingenious applieth this Table for all manner breadths, most exactly.

Example.

Fo Yn		Fo Yn		Yn Par		Yn Par		Yn Par		Yn Par													
1	48	6	$\frac{1}{4}$	11	$\frac{1}{25}$	12	$\frac{1}{4}$	11	$\frac{3}{4}$	18	$\frac{1}{4}$	7	$\frac{7}{8}$	24	$\frac{1}{4}$	5	$\frac{15}{16}$	30	$\frac{1}{4}$	4	$\frac{3}{4}$		
1	$\frac{1}{2}$	24	6	$\frac{1}{2}$	10	$\frac{1}{7}$	12	$\frac{1}{2}$	11	$\frac{1}{2}$	18	$\frac{1}{2}$	7	$\frac{4}{5}$	24	$\frac{1}{2}$	5	$\frac{7}{2}$	30	$\frac{1}{2}$	4	$\frac{5}{7}$	
1	$\frac{3}{4}$	16	6	$\frac{3}{4}$	7	$\frac{1}{2}$	12	$\frac{3}{4}$	11	$\frac{2}{7}$	18	$\frac{3}{4}$	7	$\frac{2}{5}$	24	$\frac{3}{4}$	5	$\frac{4}{2}$	30	$\frac{3}{4}$	4	$\frac{2}{3}$	
1	1	12	7	11	$\frac{4}{7}$	13	11	$\frac{15}{19}$	19	7	$\frac{4}{7}$	25	5	$\frac{3}{4}$	31	4	$\frac{5}{8}$						
1	$\frac{1}{4}$	9	7	$\frac{1}{5}$	$\frac{7}{4}$	13	$\frac{1}{4}$	10	$\frac{7}{8}$	19	$\frac{1}{4}$	7	$\frac{1}{2}$	25	$\frac{1}{4}$	5	$\frac{2}{2}$	31	$\frac{1}{4}$	4	$\frac{5}{8}$		
1	$\frac{1}{2}$	8	7	$\frac{1}{2}$	$\frac{7}{5}$	13	$\frac{1}{2}$	10	$\frac{7}{3}$	19	$\frac{1}{2}$	7	$\frac{2}{8}$	25	$\frac{1}{2}$	5	$\frac{5}{8}$	31	$\frac{1}{2}$	4	$\frac{7}{4}$		
1	$\frac{3}{4}$	6	10	$\frac{2}{7}$	$\frac{7}{2}$	13	$\frac{3}{4}$	10	$\frac{10}{2}$	19	$\frac{3}{4}$	7	$\frac{2}{7}$	25	$\frac{3}{4}$	5	$\frac{5}{8}$	31	$\frac{3}{4}$	4	$\frac{1}{2}$		
2	6		8	1	6	14	10	$\frac{2}{7}$	20	7	$\frac{1}{5}$	26	5	$\frac{1}{2}$	32	4	$\frac{1}{2}$						
2	$\frac{1}{4}$	5	4	$\frac{1}{4}$	5	$\frac{3}{7}$	14	$\frac{1}{4}$	10	$\frac{7}{2}$	20	$\frac{1}{4}$	7	$\frac{1}{8}$	26	$\frac{1}{4}$	5	$\frac{1}{2}$	32	$\frac{1}{4}$	4	$\frac{1}{2}$	
2	$\frac{1}{2}$	4	9	$\frac{3}{5}$	8	$\frac{15}{16}$	14	$\frac{1}{2}$	9	$\frac{7}{8}$	20	$\frac{1}{2}$	7	$\frac{1}{2}$	26	$\frac{1}{2}$	5	$\frac{3}{2}$	32	$\frac{1}{2}$	4	$\frac{3}{7}$	
2	$\frac{3}{4}$	4	4	$\frac{3}{8}$	8	$\frac{2}{2}$	14	$\frac{3}{4}$	9	$\frac{3}{4}$	20	$\frac{3}{6}$	7	$\frac{15}{18}$	26	$\frac{3}{4}$	5	$\frac{3}{8}$	32	$\frac{3}{4}$	4	$\frac{3}{8}$	
3	4		9	1	4	15	9	$\frac{1}{8}$	21	6	$\frac{4}{7}$	27	5	$\frac{1}{7}$	33	4	$\frac{1}{3}$						
3	$\frac{1}{4}$	3	8	$\frac{1}{3}$	$\frac{4}{7}$	15	$\frac{1}{4}$	9	$\frac{3}{7}$	21	$\frac{1}{4}$	6	$\frac{4}{5}$	27	$\frac{1}{4}$	5	$\frac{2}{7}$	33	$\frac{1}{4}$	4	$\frac{1}{3}$		
3	$\frac{1}{2}$	3	5	$\frac{1}{2}$	$\frac{11}{7}$	15	$\frac{1}{2}$	9	$\frac{2}{7}$	21	$\frac{1}{6}$	6	$\frac{7}{7}$	27	$\frac{1}{2}$	5	$\frac{2}{2}$	33	$\frac{1}{2}$	4	$\frac{2}{7}$		
3	$\frac{3}{4}$	3	2	$\frac{2}{5}$	$\frac{2}{4}$	15	$\frac{3}{4}$	9	$\frac{1}{8}$	21	$\frac{1}{4}$	6	$\frac{5}{8}$	27	$\frac{3}{4}$	5	$\frac{1}{3}$	33	$\frac{3}{4}$	4	$\frac{1}{4}$		
4	3		10	1	2	$\frac{2}{5}$	16	9	22	6	$\frac{1}{2}$	28	5	$\frac{1}{3}$	34	4	$\frac{1}{4}$						
4	$\frac{1}{4}$	2	9	$\frac{7}{8}$	$\frac{1}{4}$	2	$\frac{1}{21}$	16	$\frac{1}{4}$	8	$\frac{6}{7}$	22	$\frac{1}{4}$	6	$\frac{1}{2}$	28	$\frac{1}{4}$	5	$\frac{3}{13}$	34	$\frac{1}{4}$	4	$\frac{3}{13}$
4	$\frac{1}{2}$	2	8	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	16	8	$\frac{3}{4}$	22	$\frac{1}{6}$	6	$\frac{3}{8}$	28	$\frac{1}{2}$	5	$\frac{15}{16}$	34	$\frac{1}{2}$	4	$\frac{1}{2}$		
4	$\frac{3}{4}$	2	6	$\frac{1}{2}$	$\frac{1}{4}$	1	$\frac{1}{8}$	16	$\frac{3}{4}$	8	$\frac{3}{8}$	22	$\frac{2}{4}$	6	$\frac{3}{4}$	28	$\frac{3}{4}$	5		34	$\frac{3}{4}$	4	$\frac{1}{8}$
5	2	4	4	5	11	11	11	17	8	$\frac{1}{2}$	23	6	$\frac{1}{4}$	29	5	35	4	$\frac{1}{8}$					
5	$\frac{1}{4}$	2	3	$\frac{3}{5}$	$\frac{1}{1}$	$\frac{4}{3}$	17	$\frac{1}{1}$	8	$\frac{1}{3}$	23	$\frac{1}{4}$	6	$\frac{1}{5}$	29	$\frac{1}{4}$	4	$\frac{7}{8}$	35	$\frac{1}{4}$	4	$\frac{1}{2}$	
5	$\frac{1}{2}$	2	2	$\frac{1}{5}$	$\frac{1}{2}$	$\frac{1}{2}$	17	$\frac{1}{2}$	8	$\frac{1}{5}$	23	$\frac{1}{2}$	6	$\frac{1}{5}$	29	$\frac{1}{2}$	4	$\frac{7}{2}$	35	$\frac{1}{2}$	4	$\frac{1}{10}$	
5	$\frac{3}{4}$	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{7}$	17	$\frac{3}{4}$	8	$\frac{3}{12}$	23	$\frac{3}{4}$	6	$\frac{1}{10}$	29	$\frac{3}{4}$	4	$\frac{5}{5}$	35	$\frac{3}{4}$	4	$\frac{1}{12}$	
6	2		1				18	8	24	6	30	4	5	36	4								

The Art of measuring

Ensample.

Suppose I have a pane of Glasse or a Board, whose breadth were 22. inches, $\frac{1}{2}$. the length 16. foote. In the fourth margin, I finde this breadth, 22, and $\frac{1}{2}$. And even with it in the Table rightward, I see 6. inches, $\frac{1}{2}$. So much of my Ruler wanting some small quantitie, maketh a foote.

Now because in the length of my board (which is 16. foot) that measure is found 29. times, and $\frac{1}{2}$. parts: I conclude 29. foote there to bee, and two third parts of a foote Square, according to the length and breadth. I said (wanting some small quantity) because of the point joynd to this fraction $\frac{1}{2}$. which is put to diminish the fraction some little thing, as is declared plainly in the other Tables before put forth.

He that desireth to measure chamber flazes, pavements, or such like, let him onely multiply the breadth with the length, so the product sheweth the Content.

Ensample.

If there were a pavement 100. foot long, and in breadth 50. I must needs conclude (by multiplication of the length in the breadth) there to be contained 5000. foote.

Or thus without Arithmetike, when the
breadth exceedeth the Table.

Do the breadth in parts (as is opened in the Declaration of the table of account) and worke as I have before instructed. So for Pavements all manner waies it serveth your turne. Of this matter to put forth Tables, were superfluous tediousnes and folly. The ingenious with these few, will be satisfied.

The

The Carpenters Ruler.

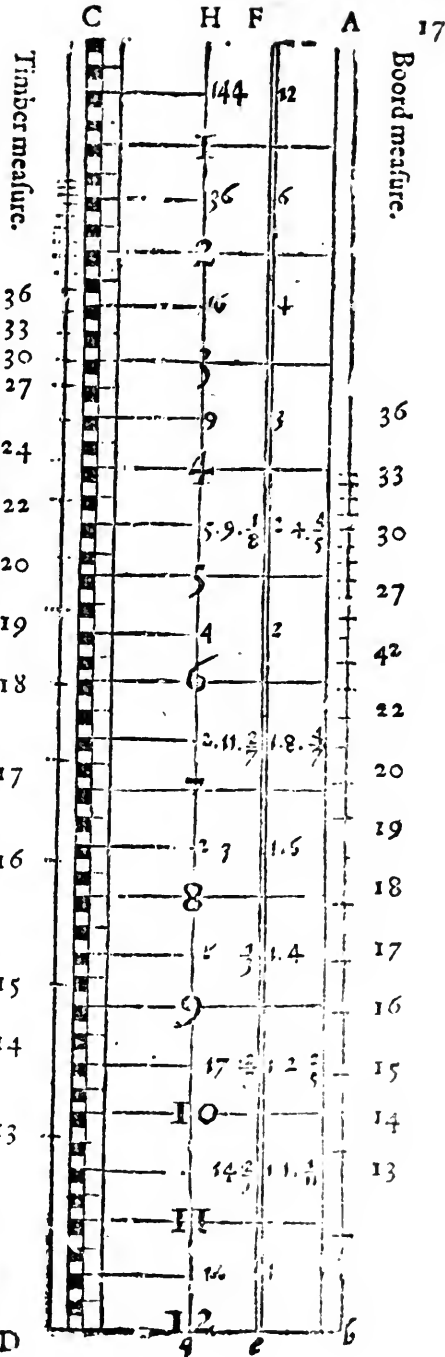
The face of the Carpenters Ruler, figured with the true measures, and other things necessary.

The xij. Chapter.

Because the effect of this Ruler is above declared by tables, an Instrument also well knowne and common among good Artificers, I will not spend many words in opening it. Behold the figures & learne by the how ye ought to make, and commonly to decke your Ruler, both with timber and board measure.

Ensample.

Admit the Ruler to be a.b. c.d. well plained, twelve Inches long, a quarter of an Inch thick, & two inches in breadth. Truly it were more commendous, if it had two foote in length. This ruler here imagined, but a foote in length is divided first in 12 even parts called inches: then every inch in halfe, or two equall portions: each half in two quarters: every quarter in foure or 2. parts at the least: as in this ensample. Then are the figures placed from 1. to 12. manifesting the inches. Thus your Ruler is ready to receive the measures which are marked or figured on your Ruler thus. Add first the timber measure as followeth.



The Carpenters Ruler.



¶ Shall resort to your table of Timber measure, and seeke how many feete belong to one Inch square: there ye shall finde 144. This number note, write, or rather graue, where this figure 1. representing one Inch, is figured as ye may see in the middelt betweene the line c. f. and the line of the figure g. h. This done, resort to your table againe, and behold how many feete and parts two Inches square requirerh. So shall ye finde 36. foote, which is placed in the next roome leftward, vnder the Character 2, signifying two Inches. Thus the rest, feete, Inches, and parts, found in your table, vntill you come to the 12. Inch, where ye shall perceiue twelue Inches onely to be set in his proper roome, &c. Then seeke further in your table what belongeth to 13. Inches. Doe tenne Inches and $\frac{1}{2}$. This must be numbred in the line c. d. from c. which line betakeneth the thickeesse of the Ruler. Make there a little strike, vpon that grosseesse, euen or right against the measure 10. What neede many wordes? Thus doe vntill you come to 36. Inches, and that is noted (as the table of timber measure shewerh) right with one Inch, and $\frac{1}{2}$. from c. No other wise is performed of board measure, as ye may behold set forth by the helpe of his proper table in the Square comes beneath the line c. f. and also the other thickeesse or line b. a.

The Carpenters Ruler.

The common vse of the Carpenters Ruler,
touching the Face afore put foorth.

The xiiij. Chapter.

The eight
Chap sheweth
how the true
square is
found.



Suppose a peece of Timber to be moaten, whose true square is 7. Inches, this square appointed you to the figure of 7. in the line g. h. vnder whom rightward in the place assigned to Timber measure, is witten 2. foote, 11. inches, 7. As often as that measure is found in the length of your timber, so many foote of timber is in that peece.

Another Example.

Imagine your Square to be 22. Inches: seeke in the line I a. c. Note then how much of your Ruler is left from that to the end of your Ruler c. and so much belongeth to a Foote. Therefore lay out the measure vpon your Timber, & reckon how many times ye may finde it, from the one to the other of your Log: so; so many foote of timber is there. Euen thus of board. Seeke the breadth vpon your Ruler, in the same or place of board measure, & immediately befoze your eyes there remaineth what is to be laid out to make a iust foote of board.

The vse of the principall lines in the Geometricall Quadrant on the backside of the Ruler,
and first of the leuell line.

The xv. Chapter.



Behoueth you to looke through your sights q. n. placed in the thickest 22. line k. m. a fine thred and plummet falling at libertie out of the Centre n. If this plummet and thred chauce precisely on y^e line of leuel (which is n. o.) what soeuer ye see through y^e sights, is leuel with your eye: if otherwise

to see the thing that ye looke vnto is not leuell, either more or lesse than the height or leuell of your eye : More, if the plummet fall to you ward : lesse, if contrarie.

How by the line of Leuell to foresee whether the water of any Spring or head is possible to be brought to a place appointed, and also to iudge the holesomnes of it.

The xvi. Chapter.



Shall goe to the head of Spring, and set your Ruler to your eye (being in height equall with the water) so that the fine corde and plummet fall precisely in the line of leuel. Now if through the sights ye may see aboue the place, know and iudge the water possible to be brought : if your sight fall vnder, impossible. It commeth commonly to passe, when the place to the which ye would haue water conueyed, is of any great distance from the head, then Hills, Valleys, and such like impediments, let the Line visuall to haue his free course: wherefoze this remedy is prouided. At the head of the spring, ye shall looke thozow the sights (as befoze) and note a marke in the next Hill toward the place, then goe to the marke in like manner obserue another in some hill : so forth vntill by any of them ye may perceiue the place desired. If then your sight running through the pinnes of your Ruler, (the thzed ener falling on the Line n.o.) excede that place, the conueying of your water is possible. Otherwise not.

Now by the way briefly ye shall be instructed how ye may know the holesomnes of water.

How good water is knowne.

Take a cleane pot, and put water in it : so set it on the fire: after a little boyling, powze it out : if then no filth remaine

The vse of the

maine in the bottome of the pot, it may bee iudged the hollo-
mer. Or thus. Let fall drops vpon metall, or rather on
Glasse (any of them being polished) and suffer that to drie
by it selfe: if after there remaine no spot or signe, it is a good
token. Moreover, if your water bee swete, pure, cleare,
light, or of little weight, it followeth the water to bee hel-
some for the vse of man.

Of the Line of height.

Whensoever the Lined and Plummet doe chauce
itselfe on the Height, which is n.p. the Altitude or
height that ye see is even with the distance from the middle
of your foote, to the nether part directly vnder the topp, e-
quall with your standing, adding the height of your Eye
downeward. Knowe that ye must euer stand vpright
with bodie and hecke, your feete fast together, the one Eye
closed, &c.

The Line of vpright Altitudes.

Judge also any thing plumb vpright when the thickness
of your Ruler i.l. is closely thereon, the plummet then at
Libertie falling on q.n. named the Line of Heights vpright.
Now followeth the vse of the Scale.

To search out Heights by the Scale with the ayd of two places.

The xvij. Chapter.

Let the Lined and Plummet fall in the one, on the
12. points: in the other Station, on the 6. of the
right shadow: double the distance betwene the
two places, the summitt appeareth from that part
of the thing measured, which is equall in Height with your
eye

eye. **D** the one in the 12. the other in 8. of right shadow: then triple the distance. The one in 12. the other in 6. of right Quadruple, the space. The one in the 12. the other in 6. of the contrarie shadow, then the space betwene both the Stations is equall with that yee measure, euer vnderstanding from your eye byward. Euen that same cometh to passe, if in the one the Thred be found vpon the 6. of the contrarie, in the other on the 4. of the same, or the 4. and 3. of the contrarie. In all these the spaces are equall with the Altitudes. So then in measuring the distance betwene the two places, yee haue the height from your eye byward, putting to it the length from your sight downeward, the whole Altitude appeareth: the Base being equall with your standing.

I would not haue you ignorant heere how to knowe lengths which be in height not easie to come vnto. For (as before) get the height of the toppes, the Altitude of the Base or longest part of your length. Subtract the lesse height out of the moze, of soze your desired length remaineth. **D**: thus: How lengths in height are knowne.
Let the plummet and thred fall in the 12. Marke your place: goe in toward the thing (the thred as it was) untill yee see the Base of that length: the distance betwene the two staddings, is vndoubtedly the Length.

How with the Scale direct or vpright heights by their shadowes are declared.

The six. Chapter.

Turne your left side vnto the Sunne, suffering his Beames to pearce both your sights q. r. placed (as aloze is sayde) in the thickenesse or line k. m. The Thred or Plumet then hanging at libertie, out of the Center n. sheweth as well the Degrees of

The vse of the

of height to be counted from 0. as the parts of the Scale cut.
If your thzed be found in the 12. part of line of leuell, shadows of all things being perpendicular eleuated, are equall with their bodies. If the plummet with the thzed be perceived, cutting the parts next to the sights, which I name poynts of the right shadow, then every thing direct is more then his shadow, by that proportion which 12. exceedeth the parts, where the thzed was found. If it fall in 1. that is the first part of the right shadow, take the shadow twelue times to make the height. In two, that is the second part, six times, in the third, foure times: in the fourth, thze times: in the fift, twise: and $\frac{2}{3}$. of the shadow, in the sixt, twise, in the seuenth once, and $\frac{1}{2}$. in the eight once, and $\frac{1}{3}$: in the ninth once, and $\frac{1}{3}$: in the tenth once, and $\frac{1}{3}$: in the eleuenth ye shall take the shadow once, and $\frac{1}{11}$ part of it.

Right shadow.

If the Arte of numbring were had, I would will you to multiplie the length of the shadow by 12. and the product diuise by the parts, in the which ye found the thzed.

Contrarie shadow.

But and if it bee in the parts of the contrary shadow, augment the length of the shadow with the parts declared by the plummet: and the increase diuise them by 12. so commeth the altitude also.

Thus the composition and whole appliance of the Carpenters Ruler is shewed: therefore somewhat shall bee now said of the Squire.

I am not ignozant that the common vse of him, is better knowne then I can with many woords expresse, wherefore I leaue to write in that behalfe. Notwithstanding I will declare how Heights and Lengths are taken, &c. matters rare and knowne of few Artificers.

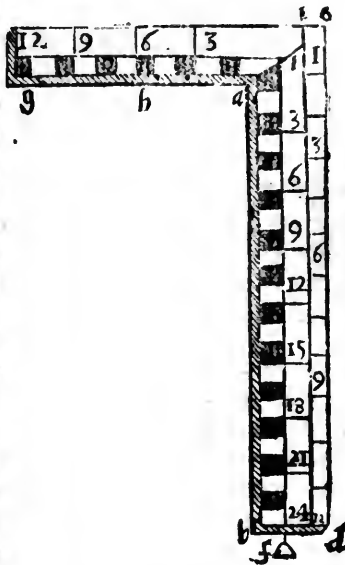
Also by tables to get a true knowledge of the day houre, and that diuerse waies, with the helpe of the Squire, as is opened in my generall Prognostication, augmented in the yeere of our Lord 1556.

What

What length the sides of thy Squire
ought to be, and the diuision of him.

The xx. Chap: et.

I Make not to put forth
the exact making of
this Instrument so well
knowne. To therfore the
figure. One side supposed
two foot from the inward
Angle : and the other a
fitt foote from the same.
The longer a. b. inward-
ly diuided from the Angle
a. vnto b. into 24. equall
principall parts, and eue-
rie of them into a lesse (if
ye list) each containing 10
minutes. Also the side c. d.
in the outward contrarie,
plaine from the top c. vnto
d. is diuided into 12. e-
uen portions: and againe
(if ye require exactnesse)



every of them into 6. each of value 10. minutes: Beholse a
line and plummet falling from e. to f. a Parallell to c. d. and
a. b. Thus this squire is well framed for the vse of diuerse
Tables put forth in my generall Prognostication, and also
for the finding of Altitudes and Longitudes, which here I
purpose now briefly to open.

How by the Squire heights are knowne.

Altitudes or heights are found, the line or plummet cen-
tered in the first point, cutting h. the middle of a. g. The
mouable

The vse of the

nonceable sights placcd in a. g. or a parallell from that line, not vnlike, as is opened of the line of height, in the backe of my Ruler.

How Lengths in plaine Ground are searched by the Carpenters or Masons Squire.

The xxi. Chapter.



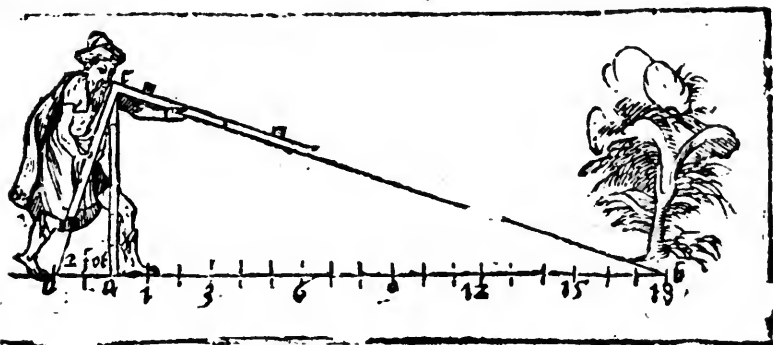
Take a staffe diuided into certaine portions as ye list, in a 100. or a 1000. parts. At the beginning of your length, vpon the very top directly standing, set the inward Angle of the Squire: list by or put downe this instrument, vntill you see the furthest part of your Longitude, I meane vntill your sight running from that Angle, to the end of your Squire, comes vnto the furthest part of that length. The Squire so remaining, and the Staffe not remoued from his height. Marke where the other ende of the Squire next vnto you noted vpon the ground. See what proportion the Staffe then beareth to the part of the ground, which the neerest end of the Squire poynted vnto from the Staffe: the same shall the Length haue to the quantitie of the same Staffe.

Example.

The cause is taken out of Euclid 33. pro. 1. booke and the 4. pro. 6. booke.

The Staffe a. c. in this figure is imagined 6. fote, and the space a. d. 2. fote. Considering now that 6. the length of the Staffe containeth 2. thrice, therefore the Longitude desired, a. b. of soze must containe three times the Staffe (which Staffe is 6. fote) that maketh 18. fote. As this is pꝛoꝛed true by a small ground in the figure following: so the arte faileth not in a greater space, which the good Speculator

Speculatoꝝ and diligent Practiser by any way cannot denie. Det experience willeth me this to confesse, that the Squire is not convenient foꝝ any long distance, but the Instrument Geometricall: whose making and vse ye may perceiue in the Treatise following) vnlesse ye ascend some Tree oꝝ Turret foꝝ your ayde, which length knowne, shall stand in stead of your Staffe.



A Note.

It behooueth you to haue a fine cord, made fast in the upper part of your Staffe c. which shall be tied euen with the inward edge of the Squire, and so dꝛa lone to the ground, where the nere end of the Square from the Staffe poynted, as yee see d.c. the other end then truly directing to the furthest distance.

Know that the ground must be very plaine and leuell, oꝝ therwise erroꝝ ensueth.

Thus the vse of the Squire is here somewhat declared, but moze in my generall Prognostication, yea most plentifulle hereafter (God sparing life) in a Booke tittled, The rare vse of the Squire in practises Mathematicall. In the which Booke, profitable pleasant experiences shall be plainly opened (only of me practised) as well of Perspective, as of the Mathematicals in generall.

A little



A little Treatise, declaring the making
and vse of an Instrument Geometricall, so
farre as it furthereth the Landmeater or Car-
penter, named the profitable
Staffe.

To the Reader.



Said in the beginning, that no little Booke would
containe the making and manifold fruits of this
princely Instrument, if it were set forth as it
ought to be in his perfection. Certes the truth
euen here maketh me confesse the same: yea that
there is no Instrument so generall and profitably pleasant:
Notwithstanding know (gentle Reader) that the occasion of
his chiefe vse and profit is not here ministred: neither, to say
the truth, doth it appertaine to, or agree with the capacitie of
such Artificers. Therefore I shall leaue to intreate of his ample
large vse and best making, and will set him forth in few words:
yea sufficiently for the Land-meaters capacitie or Carpenters
purpose, that at the least they may receiue some kinde of fruite
with the Geometrer. And in time to come (by other meanes)
as I see cause, I will largely declare, and there decke him with
his proper beauties. Here now followeth the making,
and so briefly, how he is applied for the profit of
the aforesaid Artificers.

The making of this profitable
Rode or Staffe.

The first Chapter.



¶ Shall prepare two
small, straight, stiffe,
roūd, or rather square
rods, of mettall or of
wood, well plained, of

like bignesse and length. Although
it make no matter of what length,
yet to auoyde the errors, which
little instruments, & short staues
bryng, and also to beare with the
rude vntwonted handling of such
Artificers: let your Rods be each
five, or at the least three foote, and
euery foote diuided in 12. euen
parts or Inches, as ye see a.b. and
c. d. These Rods must be forged
with a vice in the end of them to
toyne readily tenne or fire foote in
length, (when time requireth) as
the figure e. f. sheweth. Also ye
must get (by the helpe of some
Craftsman) foure other like Rods,
the longer g. 2. Foote: the next h.
1. foote: the other i. 6. Inches, then
k. 3. Inches, the last and shortest
l. 1. Inch, and . Each of these must
haue in their middelt a hole, that
the long stiffe of ten foote may be
put throught them, and they moued

on him at pleasure by and doone, alwaies cutting the lon-
ger stiffe c. f. Squirewise, and made to carry on any diuision,

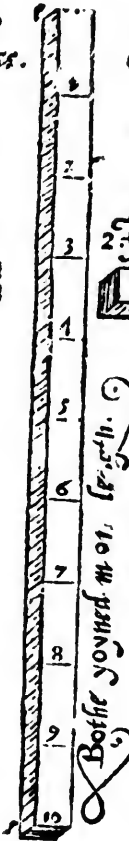
3. Inches.



1. Foote.



This staffe diuided in 5. foote, or in 60. ynches.

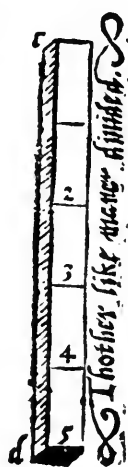


Bothe yoynd wth or 12. ynches.

6. Inches.



2. Foote in length.



Another like longer stiffe.

The vse of the

as occasion shall be giuen: which all are easie to be perceiued by the figure following, although my rude declaration hath not expressed my meaning.

Here note in the head of your short staues, ye may haue one crosse staffe two foote long, with corrant sights, so artifi- cially made, that alwaies the short staffe shall run squire vp on the longer, and the sights distant, as ye list to place them.

Things needfull to be knowne before the
vse of this Instrument is opened.

The ij. Chapter.

BEfore I intreate of this vse, it behoueth to know things necessarie, and first which of the fiue little staues g.h.i.k.l. mentioned in the making, is to be put vpon your long staffe e. f. according to the distance of the marke. Note if your marke be neere hand, be it length, breadth, or height, the longer g. doth seeme meetest to haue the roome, if more of length, the other h. and so the further distance, the shorter the staffe requireth to be, which shall oc- cuple that place. Of practise sheweth this better than many words. Also note, if chance be to goe in toward your marke, (as after ye shal see how) you must remove the short staffe in- ward more neere to the end of the longer e. If ye be compel- led to goe from it, then put it from e. toward the end f. Also remember when ye are appointed to measure any breadth or length (as shall be declared) it behooueth you to stand right with, and against that bredth: yea and the longer the bredth, or larger the widenes or length is, the better the thing will come to passe. And so; heights it is necessarie (if ye regard all precisenes) to haue the height stand directly vp.

Note this that followeth to be generall
in all workings.

Ye must stand right vp with your Bodie and necke, your foote iust together, your hands not much mouing, the one
eye

eye closed, and ever marke your standing right with the innde
of your feete. Be not ignozant here, that I call the extremes
of the little staves, the very ends where the sight ever run-
neth. And no difference betweenc the Altitude and height,
betwene the Longitude and length: the Latitude & breadth.
The shorter staves I name by the letter figured ouer them.
Your eye must euer be placed in the end of the longer staffe c.
and with the other eye ye ought to winke.

What these
words meane,
Longitude,
Latitude,
Altitude.

These trifles and such like omitted, letteth the trueth to
come to passe, and make men to suspect the Ground, which is
most certaine.

How heights standing directly vp, are measured by the Instrument.

The iij. Chapter.



At the staffe g. vpon the longer c. f. and moue
him his full length from the beginning of the
longer c. turns the ends of g. toward you, and
according to that height placing your eye (as
is sayd) euer at the beginning of the longer c.
with the other eye winke. Then goe backe

vntill ye may plainely perceiue the very vpper part of that
Altitude, and also the lower end by the extremes of your
shorter staffe g. Now the space of the middle of your foote to
the base of the height is equall with the Altitude.

Or thus.

When ye shall see any Altitude, whose measure ye require.
imagine by coniecture how oftentimes that height is found
in the space from it vnto your standing. Then moue your
shorter staffe (chosen as aboue most conuenient) euen as of-
ten his owne length from the beginning of the longer c.

The vse of the

where your eye is euer placed. This done, turne the ends of your little staffe, your eye being in e. according to the height: looke whether ye may see by the extremes of your shoter the very top, and also the lowest part of the height. If not, moue the shoter a length further toward f. or nearer to e. as ye see cause, and as your coniecture failes. Or let your little staffe remaine, as by coniecture hee was put, and goe toward o. from that height, vntill the Altitude agræ iustly with the extremes of your shoter staffe. Then marke that place with the middell of your foote.

Now ye may conclude, that the height is as often contained in the distance, which is betweene the marke and it, as the length of that little staffe is found remoued from the end of the longer, &c.

Example.

How the iust height is knowne.

If the shoter staffe be ten times his owne length from e. as firme the height contained in that distance ten times only.

The Altitude is thus gotten. Place your shoter staffe from his late being a length either toward o. or from e. as ye list to goe in o. backe. Then goe fro o. nere vnto it (as before) vntill the very summittie, and also the lowest part of the height agræ with the extremes of your shoter staffe. The space then betwæne your marked place and this latter. declareth the iust height. Often times through impediments, ye shall not haue roome to goe so farre backe or so forward, as the height commeth vnto. This remedie is provided. Place the little staffe halfe his length, and so seke two stations (as before) vntill the extreme of the shoter staffe be found iustly to answer either end of the height. When the space betwæne the two standings must be doubled to haue the iust height: or if ye list, ye may moue the shoter, according to the fourth part of his length, or to any portion, as to the first, first, twenty, &c. then shall ye haue that part of the height betwæne the two stations.

A remedie provided for want of ground.

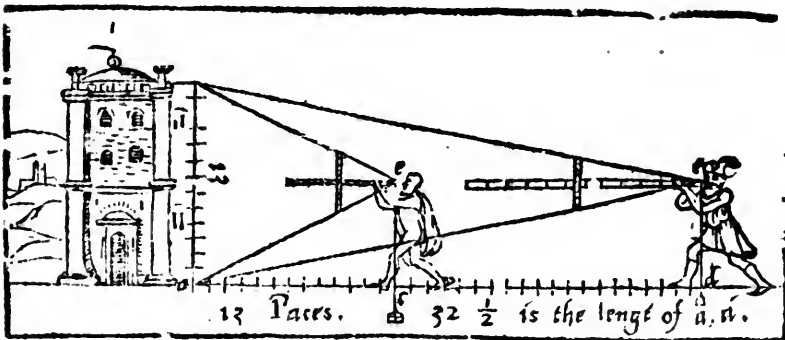
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Yet know this (which experience by diligent practise will shew) the bigger parts ye take, the lesse error ye commit. A little error often multiplied, encreaseeth to a great.

Now that all the abovespoken may the better be perceived, behold the example ensuing, as ye may see by figure declared, in the which the height is imagined a. b. the first station c. the short staffe g. is moved from c. till his length b. I am forced to conclude, that the Base of the height a. b. is from my standing c. even his precise length b. So then if ye measure that distance of a. c. being 13. paces, ye have the true height of a. b. as many. In the other standing place d. the shorter staffe is found from c. twice his length and a halfe, wherefoze I must affirme the height a. b. to be contained o3 found in the distance a. d. twice and a halfe: which length a. d. is apparant 32. paces. All this that is spoken of the height, may well be understood of Latitudes o3 widenesses, and lengths following.

The ground of this may be gathered of Euclide in his perspective. 21. Theo.

In Altitudes this rule is not perfect, except the eye be level with the middle of the Altitude.



The vse of the

How the breadth or widenes of things
are found, and by them, Length or any
distance at pleasure.

The iij. Chapter.



Whatsoever I haue instructed afoze of heights,
the same vnderstand here of widenes, lengths,
ec. For none otherwise are Latitudes or wide-
nesses searched by this Instrument, then before
is declared of heights, onely this excepted, that
the short Staffe must lie contrarie, the ends according to the
breadth, seeing by the extreames of the short Staffe, the verti-
cuttermost parts or ends of the Latitude, noting your Stati-
ons right with the midst of your foot. And so perforce all as
afoze. And as I said, thereof the parts of the height found be-
twene your Standings, euen the same things is well vsed
here, for all manner parts of the breadth.

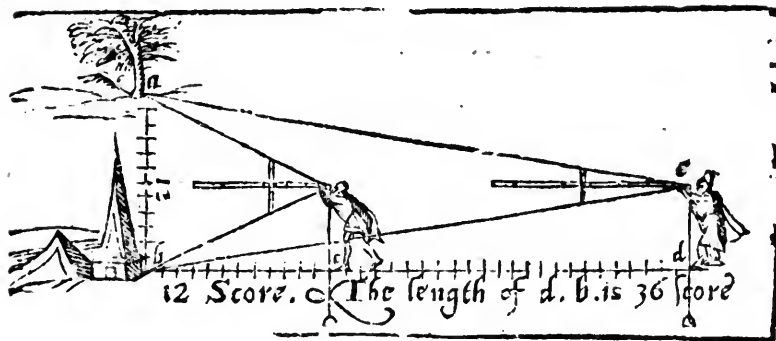
Example.

The breadth in this figure following suppose a. b. Also
the first station c. the next d. My desire is to know the
widenesse a. b. and the length or distance d. b. Marke how the
ends of the lesser Staffes are turned to the extreames of the
widenesse. When behold how the short Staffe in c. is but once
his length remoued from c. Therefore (by the instructions
of heights afoze) ye may boldly say, that the widenes a. b. is
but once contained betwene d. and b. and that measure is
found 12. scoze, as much as is the other a. b. In the second
standing d. the little Staffe is remoued three times his length
from e. For that cause I conclude (and truly) from b. to that
station three times the breadth, which breadth is 12. scoze. So
by the widenes I haue found the length of b. d. 36. scoze, my
desire. Thus are Latitudes found, and by them Lengths, &c.

Behold

Behold the figure.

Ye must alway stand directly against the middle of the Breadth.



Whensoeuer any distance is put, whose certaine length ye require: measure (by the art expressed) either the height of any thing there found, or the breadth, and see how oftentimes that widenesse or length is contained vnto your standing: which knowne, the length cannot bee hid, as is declared.

Now in few words to conclude, ye may by this Instrument measure the distance of Houses, Steeples, Trees, the length of Wallles, the breadth of Ditches, Images in height, and suchlike. The good Wittie Carpenter standing in a place, where hee may plainly see a whole house, or any manner frame with great pleasure, may by this get spreadie the true proportion of that house, which he ought to note in a Table, and when time commeth (not without his great praise) may make, reare and set by the like. This I take to be sufficient for these Craftsmen.

A more larg
vse of this In-
strument.

I haue.

The vse of the, &c,

How the
length of
is exactly
found.

I have not forgotten to admonish you whensoever ye list
to measure any land exactly, by the instrument Geometri-
call, nam'd the portable Scale, to set upright a Rodde, the
length of a Pearch. Or if the distance be long, to passe out, or
rather withy more fine or more Pearches at the end or head
of your length, the extreames noted with two visible marks.
Then goe from thence, and seeke the lengths by that certaine
wideneffe, as is declared: so shall ye not faile to bring verie
true land. Note that a little erroz found on the breadth, oft
multiplied, encreaseth to a great, yea, to an intolerable fault
in the length, therefore the breadth or wideneffe ought truly
to be searched. Whis I take sufficient for these Craftsmen.

I would desire where my grosse writings seeme to be ob-
scure, that I were present the instructer: for truly a lively
voyce of a meane speculatoz somewhat practised, furthereth
tenne fold more in my iudgement, than the finest wryter.

Farewell. Accept my god will, and looke shortly (if
God spare lffe) for a profitable encreas of
these matters

FINIS.

HM

86. 1616

The true Marrying of the
degrees of Sovereign Honour are
thide

the true Marrying of the
degrees of Sovereign Honour are
thide

Of Honour.

of Factions.
to partur persons one by one. But
It is not that the consideration of
Factions is to be neglected.

Meane men must adheare, but
great men that haue strength in the-
selves were better to maintain them-
selves indiffirent and neutrall, Yet
euen in beginners to adheare so mo-
deratly as he be a man of the one
faction, which is passablest with the
other, commonly giueth best way.

The lower and weaker Faction is

These are for spending, and spe-
nding for honour and good ad-
vantage. The more extraordinary expence
must be limited by the worth of the
occasion, for venturing vnderdoing may
be as well for a mans country as for
the kingdom of the world. The ordina-
ry expence ought to be limited by a
mans estate, and giveth with in
said, as it be within his compasse

Of expence.

Some kind of iudors, but doeth quic-
ken and awake others. But ryming
of the iudors is the principall ryming
that should giueth it, but in respect of
those which are like to continue. No-
thing is thought to cause a request to
a great person as his letter, and yet
it be not in a good cause, it is so
much out of his reputation.

Of expence.

Of followers and friends.

content, because they may claime a
due. But in fauours to vie men with
much difference of election is good,
for it maketh the persons preferred
more thankfull, and the rest more of-
ficious, because all is of fauour. It is
good not to make too much of any
man at first because one cannot hold
out that proportion. To be gouerned
by one is not good, & to be dist ac-
ted with many is worse: but to take
advise of friends is euer honourable.

For lockers of many friends

B 3

of disabling the better defender. In
 sutes a man doth not well understand,
 it is good to refer them to some tried
 of trust & iudgment, that may report
 whether he may deale in them with
 honor. Sutors are so distastid with
 delaires & abuses, that plain dealing
 in denying, so deale in sutes at first,
 and reporting the success barely, and
 in challenging no more thanks than
 one hath deduced, is grown not on-
 ly honorable, but also gracious. In
 sutes of nature the first coming ought
 to take little place, so far forth con-
 sideration may be had of his trust, that
 if intelligence of the matter could not
 otherwise have been had but by him,
 advantage be not taken of the note.
 To be ignorant of the value of a sute
 is simplicity, as well as to be ignorant
 of the right thereof is want of confi-
 dence. Secrecy in sutes is a great mean
 of obtaining, for voycing them to
 be in forwardness may discourag-

Of Sutes.

brace Sutes which neuer meane to
 deale effectually in them. But if they
 see there may be life in the matter by
 some other meane, they will be con-
 tent to win a thanke, or take a second
 reward. Some take hold of sutes only
 for an occasion to croisse some other,
 or to make an information, whereof
 they could not otherwise haue an apt
 pretext, without care what becoë of
 the sute, when that turn is serued Nay
 undertake sutes with a full pur-

Lieutenants

the first place are *Conditors*,
 founders of states. In the seconde
 place are *Legislators*, Law-givers,
 which are also called second foun-
 ders, or *Empetiv principes*, because
 they gouern by their ordinances at-
 ter they are gone. In the third place
 are *Libertores*, such as compounde
 the long intineries of civil wars, or de-
 liver their countries from seruitude
 of strangers or tyrants. In the fourth
 place are *propagatores*, or *propugnatores*
imperii, such as in honorable wars in-
 large their territories, or make No-
 ble defence against invaders. And in
 the last place are *Artes parua*, which
 raise the lusty, and make the times
 good where in they liue. Degrees of
 honor in sutes are first *Particeps*
contra vim, those upon whom princes
 do distribute the greater weight of
 their affairs, their *Right hands* (as we
 call them.) The next are *Duces bel-*
 li, great leaders, such as are Princes

Offaction.

Lieutenantes, and do them notable
 seruices in the warres. The third are
Gratiosi, fauorites, such as exceed not
 this scantling to be so close to the So-
 ueraigne, and harmles to the people.
 And the fourth *Negotijs pares*, such as
 haue great place vnder Princes, and
 execute their places with sufficiency

Of Faction.

Any have owe wife



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